Core Topics

- Differentiation rules for vector-valued functions.
- How to do a line integral [both kinds].
- FToLI [and conservative fields]
- How to do a surface integral [both kinds].
- How to do a volume integral.
- Stokes' Theorem
- The divergence theorem

- The generalized derivative

- The chain rule for functions from $\Re^m \rightarrow \Re^n$.

- Properties of div, grad, curl.

Peripheral topics.

- Applications of integration:

  1. Average Value of Function

  2. Mass/density

  3. Probability

  4. Arc Length

- Parametrization

1. With respect to arc length
2. spiral with varying radii
3. elliptical disk
4. sphere
5. elliptical ball
6. cylinder
7. cone
8. graph
9. surface of revolution
10. plane
11. triangle
12. parallelepiped

13. lines

- Application of Stokes Theorems
  1. Evaluation of difficult integrals
  2. Area of a planar region enclosed by a curve
  3. Dealing with holes in the domain
  4. Orientation of Boundaries